International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 12 | Dec 2020 www.irjet.net p-ISSN: 2395-0072

Automation of Home Appliances and Alert System using ESP8266

Varanasi Shanmukha Shashank[1], Kukkamudi Nikhil Chakravarty[2]

[1,2]UG student, Dept. of Mechanical Engineering, Mahatma Gandhi Institute of Technology, Hyderabad, India

---

Abstract - *The Internet of Things refers to the many physical devices round the world that are connected to the web, collecting and sharing data. With the advancement of technology mobile devices are a very important a part of our lives moreover as internet of things (IoT).In other words, we will say internet of things may be a system of interrelated computing devices, mechanical and digital machines, objects, animals or those that are supplied with unique identifiers (UIDs) and also the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. In this project, equipment and sensors like passive infrared sensor (PIR), Wi-Fi relay, DHT11 sensor, ESP8266 microcontroller, Alcohol and Gas detector are used. This project deals with connecting mobile device with IoT for the automation of basic household appliances.*

Key Words: **IoT, Microcontroller, PIR sensor, DHT11 sensor, Household appliances**

1. INTRODUCTION

With the passing of time, the world is rapidly emerging in the field of technology and new methods to automating things. Automating our homes helps us in many ways like controlling the appliances and gadgets from anywhere around the world, keeping track of the time that an appliance was used, Gas leak alert, theft alert.

This project is equipped with number of sensors to read the presence of any moving objects, temperature, gas leak. All this data is simultaneously sent to the user mobile as the microcontroller is embedded with Wi-Fi chip. This project also contains Wi-Fi relay for controlling the home appliances such as lights, fan, air conditioners, electric lock, television and almost all the electronics that use electricity to work. These appliances can be controlled by using a mobile application.

2. LITERATURE

The aim of this project is to automate all houses for better living and make things easy. The main inspiration of this project started with a simple idea to make things automatic and transmit reliable data.

3. COMPONENTS AND SENSORS

3.1 ESP8266

NodeMCU is an open source firmware which is developed for ESP8266. Since it is an open source platform, the hardware design can be modified according to the type of usage. The main microprocessor, ESP8266 also has an inbuilt Wi-Fi functionality and can be connected to any mobile phone.

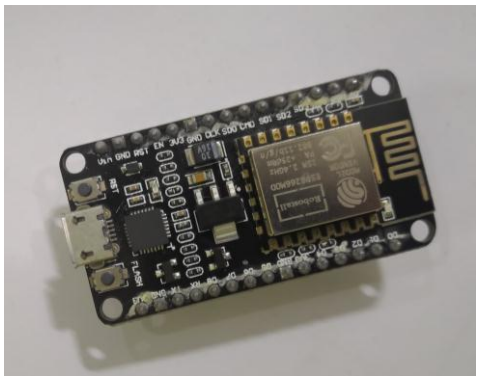

Figure 1: ESP8266 Microcontroller

3.2 PASSIVE INFRARED SENSOR (PIR)

Passive infrared sensor or commonly known as PIR sensor is generally used to measure the radiating infrared (IR) light emitted by a body within it field of view. PIR sensors are mainly used in security purposes where motion detection is much need and also in-home applications for automating lights. This PIR sensor mainly works on the principle of radiation. Our human eyes have some limitations and we can't see radiated infrared wavelengths with naked eyes but that radiation effect can be detected by the use of PIR sensor.

This sensor has field of view ranging from 10meters to 15meters.

Figure 2: PIR sensor

3.3 GAS SENSOR

Gas detector sensor is a device that helps in identifying the concentration of gas present in atmosphere or in a particular place. A potential difference is created based upon the concentration of the gas by changing the material resistance inside the sensor. This created resistance is measured as output voltage and based upon this voltage the concentration of the gas is calculated and displayed.

The main principle on which gas sensor works depends on Chemiresister of conduct current. Tin dioxide (SnO2) is a n-type semiconductor which is most commonly used Chemiresister that has free electrons. As the atmosphere contains more amount of oxygen than combustible gases, the oxygen particles attract free electrons present in Tin dioxide which pushes them to the surface of Tin dioxide and no free electrons are available resulting in zero current. Usually gas sensors are used in industries to measure the concentration of toxic gases, detecting fire, checking the quality of air, breath analyzer and many more.

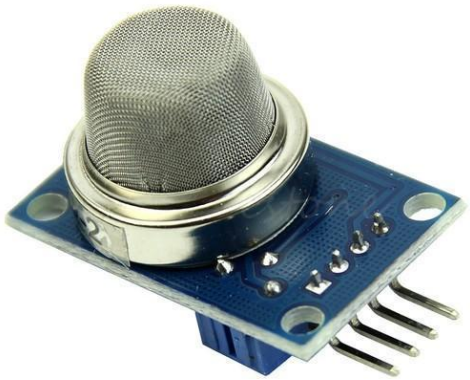

Figure 3: Gas sensor

3.4 Wi-Fi relay

Wi-Fi relay helps us in controlling different devices and gadgets of our home via Wi-Fi. This controlling can be done directly with the help of mobile application. These relays are categorized as 4 channel relay, 6 channel relay, 8 channel relays for the type of usage and number of appliances the user want to control.

Figure 4: 4 channel Wi-Fi relay

4. COMMUNICATION NETWORKS

4.1 IoT

Internet of things or IoT is network of devices connected to internet for the transmission of data or information over a large distance without any hassle. In this project, the NodeMCU is connected to all the other sensors which helps in transmission and reception of data sent by the sensors and user.

4.2 Blynk Mobile Application

In this project Blynk is the application used to control the sensors connected to NodeMCU via Internet. This Blynk application is supported in both android as well as IOS platform. As Wi-Fi relay is used in this project, the common home appliances such fans, lights, television, air conditioners, refrigerators etc. can be easily controlled with this application with just one click. All the data sent by the sensors and all the commands given by the user are transmitted to one another via internet. Also, this application sends the user real time motion detection alerts and gas leakage alerts to prevent from any mishap happening.

5. Block Diagram

The block diagram of this project is show in the following figure.

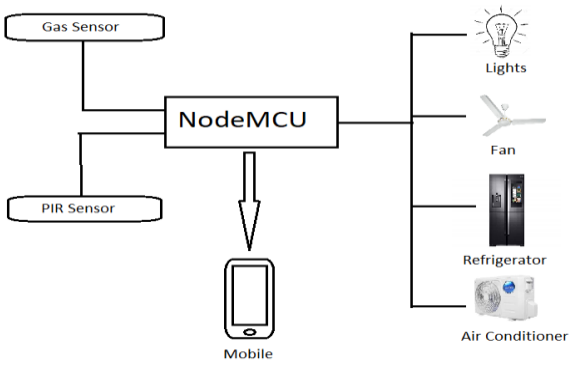

Figure 5: Block Diagram

6. WORKING

The working of this project is very simple and very reliable. The NodeMCU is the main processor used in this project is connected to several sensors such as Gas detector, PIR sensor and a Wi-Fi relay. The PIR sensor which is equipped in this project helps in identification of any motion of person within its range. This helps as a security factor by alerting the user that some person is present inside the house while the user is away from the home or out of station and stop from any theft happening. The second sensor used is the Gas detector sensor. While the user is not present in the home or busy in some other work, then this sensor detects whether any gas leakage is taking place. If there is any gas leakage then the NodeMCU instantly sends the user an alert of this leakage so that the user can take any preventive measures from any blast or mishap happening. And the third module used is the Wi-Fi relay module by which several home appliances can be controlled. All the appliances which the user want to control are connected to this Wi-Fi relay and the user can control them wireless from any part of the world. A simple click from the Blynk application can turn ON and OFF the appliances which are connected to the Wi-Fi relay. All these alert systems and appliances are connected to the Blynk application via internet which uses IoT.

7. FUTURE SCOPE

Internet of things is becoming a part of human life day by day and every hour a new development is made to make human life easy. This project deals with the basic concept of automating home appliances and providing a basic alert system that every person can afford and can easily use it. In future several more alert and security systems and more sensors can be equipped by the needs of the user to make their life easy and all those new technologies can be controlled by an application and with the help of IoT.

REFERENCES

[1] Mrs. Sarika A. Korade, Dr. Vinit Kotak, Mrs. Asha Durafe, "A Review Paper on Internet of Things (IoT) and its Applications," Volume: 06 Issue: 06 | June 2019, IRJET

[2] ANAND M, Yaganti venkatesh G Vinod Kumar, S Praveen Kumar, Mrs. Asha Durafe, "THEFT CONTROL USING IOT," Volume: 05 Issue: 03 | Mar-2018, IRJET

[3] https://en.wikipedia.org/wiki/Internet_of_things.

BIOGRAPHIES

Varanasi Shanmukha Shashank
Student of Mechanical Engineering, Mahatma Gandhi Institute of Technology, Hyderabad, India

Kukkamudi Nikhil Chakravarty
Student of Mechanical Engineering, Mahatma Gandhi Institute of Technology, Hyderabad, India